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EXAMINER	
FOTAKIS, ARISTOCRATIS	

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2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/563,634	KOGA ET AL.
	Examiner	Art Unit
	ARISTOCRATIS FOTAKIS	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02/12/2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 5 - 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 5 - 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 14 and 17 are objected to because of the following informalities: CODEC should be defined at least one in the claims.

Claims 14 and 17 are objected to because of the following informalities: Claim 14 recites of “a demodulation unit operable to demodulate the result outputted from said CODEC unit to output a demodulated result” in Lines 9 -10 and “to receive the demodulated result” in Lines 1 – 2 of Page 8. The limitations should be corrected as “a **modulation** unit operable to **modulate** the result outputted from said CODEC unit to output a **modulated** result” and “to receive the **modulated** result”. Similarly for claim 17. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 5 – 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong et al ("A Joint Channel Diagonalization for Multiuser MIMO Antenna Systems" IEEE Transactions on Wireless Communications, Vol 2, No.4, July 2003) in view of Garnier et al ("Performance of an OFDM-SDMA based System in a Time-Varying Multi-Path Channel", IEMN-DHS, ENIC, 2001 IEEE) and further in view of Tanaka et al (US 2003/0124995).

Re claim 1, Wong teaches of a wireless communication system comprising: a base station (BS, Fig.1); a plurality of terminals (Ms_1 – MS_M, Fig.1); and a control unit (multiuser channel diagonalization, Abstract), wherein said base station and each terminal of said plurality of terminals are operable to simultaneously perform space division multiplex wireless transmission of information using a same frequency (SDM, Page 773), wherein at least one terminal of said plurality of terminals communicates with said base station via a plurality of propagation paths (Fig.1), wherein said base station comprises a base station multi-beam antenna (Fig.1) used for the space division multiplex wireless transmission (SDM), wherein said base station multi-beam antenna comprises a plurality of base station antenna elements (M antenna elements, Fig.1), wherein each terminal of said plurality of terminals comprises a terminal multi-beam antenna used for the space division multiplex wireless transmission (Fig.1, SDM), wherein said terminal multi-beam antenna comprises a plurality of terminal antenna elements (L antenna elements shown for each Mobile station, Page 784, Col 2 to Page 785, Col 1), and wherein said control unit is operable to orthogonalize a beam pattern of said base station multi-beam antenna to control the space division multiplex wireless transmission (Pages 775 – 776, 785, multi-channel diagonalization) wherein said control unit is operable to orthogonalize the beam pattern of said base station multi-beam antenna based on a plurality of transfer function values determining a radio-wave-propagation characteristic between said plurality of base station antenna elements and said plurality of terminal antenna elements (equation 5). However, Wong does not teaches of wherein each of said plurality of terminals is operable to transmit, to said

base station, pilot signals to be used for estimation of a radio-wave-propagation characteristic between each of said plurality of terminals and said base station, wherein said base station is operable to receive the pilot signals, and wherein said control unit is operable to detect a phase and/or an amplitude drift amount of the pilot signals, to calculate a plurality of transfer function values based on the pilot signals.

Garnier teaches of a plurality of terminals (Fig.1) operable to transmit, to said base station (Fig.1), pilot signals to be used for estimation of a radio-wave-propagation characteristic between each of said plurality of terminals and said base station, wherein said base station is operable to receive the pilot signals, and wherein a control unit is operable to calculate the plurality of transfer function values based on the pilot signals (Page 1686, Col 1, last paragraph, Col 2, A.System Model and Page 1688, IV Channel Estimation Scheme). However, Garnier does not specifically teach of wherein said control unit is operable to detect a phase and/or an amplitude drift amount of the pilot signals, to calculate a plurality of transfer function values based on the pilot signals.

Tanaka teaches of a transmitting diversity communication apparatus (Fig.2) wherein the base station (Fig.13) is operable to receive the pilot signals (#20, Fig.2), wherein the control unit (#26 and #25) is operable to detect a phase and/or an amplitude drift amount of the pilot signals (feedback information, Paragraphs 0040 - 0041), to calculate a plurality of transfer function values based on the pilot signals (h_1, h_2, ..h_N), Paragraph 0040).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used pilot signals for channel estimation for a reliable

estimation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have detected the phase and/or an amplitude drift amount of the pilot signals so as to improve the quality of data transmission.

Re claim 5, Wong teaches of wherein said control unit is operable to calculate eigenvectors of a channel matrix whose matrix elements are composed of the plurality of transfer function values, and wherein said control unit is operable to control a set of weight to be imposed on said plurality of base station antenna elements using the eigenvectors of the channel matrix (Page 777, Col 2).

Re claim 6, Wong teaches of wherein said control unit is operable to calculate a plurality of diagonal elements (Λ, equation 11) of a channel matrix whose matrix elements are composed of the plurality of transfer function values (H_m), and wherein said control unit is operable to control a set of weight to be imposed on said plurality of base station antenna elements using the plurality of diagonal elements of the channel matrix (Page 775, Col2, Section III and Page 776).

Re claim 7, Wong teaches all the limitations of claim 1 except of when one of said plurality of terminals has moved, the one of said plurality of terminals is operable to transmit, to said base station, movement pilot signals to be used for estimating a radio-wave-propagation characteristic between said one of said plurality of terminals and said base station, said base station is operable to receive the movement pilot signals, said

control unit is operable to re-calculate a plurality of transfer function values concerning the one of said plurality of terminals, and said control unit is operable to orthogonalize the beam pattern of said base station multi-beam antenna based on the plurality of re-calculated transfer function values.

Garnier teaches of when one of said plurality of terminals has moved (Doppler), the one of said plurality of terminals is operable to transmit, to said base station (Fig.1), movement pilot signals to be used for estimating a radio-wave-propagation characteristic between said one of said plurality of terminals and said base station (Page 1689, Col 2 and Page 1688), said base station is operable to receive the movement pilot signals, re-calculate a plurality of transfer function values concerning the one of said plurality of terminals (Page 1689, Col 2 to Page 1690, Col 1), and orthogonalize the beam pattern of said base station multi-beam antenna based on the plurality of re-calculated transfer function values (OFDM-SDMA, Fig.4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used pilot signals for channel estimation for a reliable estimation and recalculate a plurality of transfer function values concerning the one of said plurality of terminals in order to decrease the bit-error-rate and maintain orthogonality.

Re claim 8, Wong and Garnier teach all the limitations of claim 7. Garnier also teaches of re-calculating a plurality of transfer function values concerning one or more un-moved terminals, the one or more un-moved terminals belonging to said plurality of

terminals (Fig.6, *BER is a function of the channel length (proportional to the maximum delay spread)*).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have re-calculated a plurality of transfer function values concerning one or more un-moved terminals in order to compensate for high BER values due to delay spread.

Re claim 9, Wong and Garnier teach all the limitations of claim 7. Garnier also teaches of not re-calculating a plurality of transfer function values concerning one or more un-moved terminals, the one or more un-moved terminals belonging to said plurality of terminals (Fig.7, *BER is a function of the Doppler frequency, BER drops for a decreasing Doppler frequency*).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have not re-calculated a plurality of transfer function values concerning one or more un-moved terminals since an un-moved terminal would have a low BER and would decrease computational time.

Re claim 13, Wong teaches of wherein said control unit is provided within said base station (Abstract and Page 773, Col 2, Paragraph 1).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wong et al ("A Joint Channel Diagonalization for Multiuser MIMO Antenna Systems" IEEE Transactions on Wireless Communications, Vol 2, No.4, July 2003) in view of Karimi et al (US 2001/0046882)

Wong teaches of a base station for a wireless communication system comprising said base station and a plurality of terminals, said base station and said plurality of terminals simultaneously performing space division multiplex wireless transmission of information using a same frequency, each of said plurality of terminals comprising a plurality of terminal antenna elements, said base station comprising: a base station multi-beam antenna comprising a plurality of base station antenna elements; and an antenna-controlling unit (Page 775, Col 2) operable to control the space division multiplex wireless transmission via said plurality of base station antenna elements, wherein said antenna-controlling unit is operable to calculate a plurality of transfer function values determining a radio-wave-propagation characteristic between said plurality of base station antenna elements and said plurality of terminal antenna elements to orthogonalize a beam pattern of said base station multi-beam antenna based on the determined radio-wave-propagation characteristic (see claim 1). However, Wong does not specifically teach of a CODEC unit operable to encode inputted signals to output a result; a modulation unit operable to modulate the result outputted from said CODEC unit to output a modulated result; a frequency-converting unit operable to

convert a frequency of the sending signals to output a converted result to said base station multi-beam antenna.

Karimi teaches of a SDMA basestation that comprises of a CODEC unit operable to encode inputted signals to output a result (#14, Fig.3); a modulation unit operable to modulate the result outputted from said CODEC unit to output a modulated result (TX, Fig.3, Paragraph 0026); an antenna-controlling unit operable to control the space division multiplex wireless transmission via said plurality of base station antenna elements, and to receive the modulated result, to output sending signals (beamforming, Fig.3); and a frequency-converting unit operable to convert a frequency of the sending signals to output a converted result to said base station multi-beam antenna (IF to RF, Fig.3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have codec unit to encode the data for the purposes of security, to modulate the data in order to group the bits into symbols and a frequency-converting unit in order to convert the baseband/IF signal into an RF signal for transmission.

Claim 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong in view of Garnier and further in view of Karimi.

Wong teaches of a terminal for a wireless communication system comprising a base station and a plurality of terminals, each of said plurality of terminals being composed of said terminal, said plurality of terminals and said base station

simultaneously performing space division multiplex wireless transmission of information using a same frequency with each other (Fig.1, Abstract), said terminal comprising: a terminal multi-beam antenna comprising a plurality of terminal antenna elements (Page 784, C.Discussion). However, Wong does not specifically teach of a pilot signal-generating unit operable to generate pilot signals used for estimation of a radio-wave-propagation characteristic between said base station and said terminal, wherein said terminal multi-beam antenna is operable to transmit to said base station the pilot signals generated by said pilot signal-generating unit. Wong does not specifically teach of a CODEC unit operable to encode inputted signals to output a result; a modulation unit operable to modulate the result outputted from said CODEC unit to output a modulated result; a frequency-converting unit operable to convert a frequency of the sending signals to output a converted result to said base station multi-beam antenna.

Garnier teaches of a pilot signal-generating unit operable to generate pilot signals used for estimation of a radio-wave-propagation characteristic between said base station and said terminal, wherein said terminal multi-beam antenna is operable to transmit to said base station the pilot signals generated by said pilot signal-generating unit. (Page 1686, Col 1, last paragraph, Col 2, A.System Model and Page 1688, IV Channel Estimation Scheme).

Karimi teaches of a SDMA basestation that comprises of a CODEC unit operable to encode inputted signals to output a result (#14, Fig.3); a modulation unit operable to modulate the result outputted from said CODEC unit to output a modulated result (TX, Fig.3, Paragraph 0026); an antenna-controlling unit operable to control the space

division multiplex wireless transmission via said plurality of base station antenna elements, and to receive the modulated result, to output sending signals (beamforming, Fig.3); and a frequency-converting unit operable to convert a frequency of the sending signals to output a converted result to said base station multi-beam antenna (IF to RF, Fig.3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used pilot signals for channel estimation for a reliable estimation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have codec unit to encode the data for the purposes of security, to modulate the data in order to group the bits into symbols and a frequency-converting unit in order to convert the baseband/IF signal into an RF signal for transmission.

Claims 10 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong and Garnier in view of Alexiou (US 2002/0098873).

Re claim 10, Wong and Garnier teach all the limitations of claim 7 except of wherein said control unit, utilizing mobility as a parameter indicating degree that one of said plurality of terminals has moved in space per unit time, is operable to determine priority of orthogonalization of said base station multi-beam antenna.

Alexiou teaches of beamforming in a SDMA base station wherein a control unit, utilizes mobility as a parameter indicating degree that one of said plurality of terminals

has moved in space per unit time (Figs.2B – 2C, Paragraphs 0019 - 0020), is operable to determine priority of orthogonalization of said base station multi-beam antenna (*when the CIR (proportional to the angle spread) of one mobile user reaches the threshold, that mobile is allocated to a different channel)*, Paragraph 0020).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a control unit utilizing a parameter indicating degree that one of said plurality of terminals has moved in space per unit time to determine priority of orthogonalization in order to avoid unacceptable levels of interference and keep an acceptable angle spread that would maintain orthogonality.

Re claim 11, Wong, Garnier and Alexiou teach all the limitations of claim 10 as well as Alexiou teaching of determining the priority of orthogonalization of said base station multi-beam antenna. However, Alexiou does not specifically teach of determining the priority of orthogonalization of said base station multi-beam antenna such that priority of one of said plurality of terminals having certain mobility is higher than priority of another of said plurality of terminals having mobility greater than the certain mobility.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a control unit utilizing a parameter indicating degree that one of said plurality of terminals has moved in space per unit time to determine priority of orthogonalization according to the levels of interference caused by the beams and prioritize starting with the terminals causing the highest interference according to the

angle spread that causes severe disruption to orthogonality and would result in signal loss.

Re claim 12, Wong, Garnier and Alexiou teach all the limitations of claim 10 as well as Alexiou teaching wherein the mobility of said plurality of terminals is expressed in terms of respective identifiers (CIR threshold (*proportional to angle spread*)) given to said plurality of terminals, said plurality of terminals are operable to transmit to said base station the respective identifiers, said control unit is operable to receive the respective identifiers transmitted from said plurality of terminals, and said control unit is operable to determine the priority of orthogonalization of said base station multi-beam antenna based on the respective identifiers received by said base station (see claim 10).

Claims 15 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong and Karimi in view of Alexiou (US 2002/0098873).

Re claim 15, Wong and Karimi teach all the limitations of claim 14 except of wherein said base station further comprising: an interference amount-estimating unit operable to estimate an interference amount in a pair of propagation paths between said plurality of terminals and said base station, wherein said antenna-controlling unit is operable to determine a beam pattern of said base station multi-beam antenna based on the interference amount estimated by said interference amount-estimating unit.

Alexiou teaches of a base station comprising: an interference amount-estimating unit operable to estimate an interference amount in a pair of propagation paths between said plurality of terminals and said base station (Paragraphs 0008, 0019 - 0020), wherein said antenna-controlling unit is operable to determine a beam pattern of said base station multi-beam antenna based on the interference amount estimated by said interference amount-estimating unit (Fig.2A-2C, Paragraphs 0019 – 0020 and 0040).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have estimated an interference amount in a pair of propagation paths in order to prevent angular unresolvability.

Re claim 16, Wong and Karimi teach all the limitations of claim 14 except of wherein said base station further comprising: a mobility-identifying unit operable to identify mobility of each of said plurality of terminals, the mobility indicating degree that one of said plurality of terminals has moved in space per unit time, wherein said antenna-controlling unit is operable to determine a beam pattern of said base station multi-beam antenna based on the mobility identified by said mobility-identifying unit (Page 775, Col2, Section III and Page 776).

Alexiou teaches of a base station comprising: a mobility-identifying unit operable to identify mobility of each of said plurality of terminals, the mobility indicating degree that one of said plurality of terminals has moved in space per unit time, wherein said antenna-controlling unit is operable to determine a beam pattern of said base

station multi-beam antenna based on the mobility identified by said mobility-identifying unit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have identified the mobility indicating degree that one of said plurality of terminals has moved in space per unit time in order to prevent angular unresolvability.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wong, Garnier and Karimi in view of A. Van Zelst ("*Space Division Multiplexing Algorithms*", 2000 IEEE).

Wong, Garnier and Karimi teach all the limitations of claim 17 as well as Wong further teaching wherein said terminal further comprising: an antenna-controlling unit operable to control wireless communications via said plurality of terminal antenna elements, and wherein said antenna-controlling unit is operable to cancel an interference wave (Page 776, Col 2), after said base station has orthogonalized a beam pattern (diagonalization, Page 775 - 776). However, Wong and Garnier do not specifically teach of cancelling the interference wave utilizing at least one of a zero forcing method and a maximum likelihood estimation method.

Van Zelst teaches of Space Division Multiplexing Algorithms where cancelling the interference wave utilizing at least one of a zero forcing method and a maximum likelihood estimation method (Pages 1219 - 1220).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have cancelled the interference wave utilizing at least one of a zero forcing method for its manageable complexity or a maximum likelihood estimation method for its best BER performance.

Response to Arguments

Applicant's arguments filed February 12, 2009 have been fully considered but they are not persuasive.

Applicants submit that Garnier only teaches that pilot signals are used in a single antenna system, but fails to disclose or suggest that each respective terminal is operable to transmit, to the base station using multiple terminal antenna elements, pilot signals used for estimating a radio-wave-propagation characteristic between the respective terminal (including the multiple antenna elements) and the base station, as recited in claim 1.

Examiner submits that Garnier teaches of the base station using multiple terminal antenna elements as shown in Fig.1, wherein pilot signals are used for estimating a radio-wave-propagation characteristic between the respective terminal (including the multiple antenna elements) as recited by Garnier in Page 1688. Pilot signals are used for channel estimation as taught by Garnier in Page 1688, Col 1 (pilot arrangement).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ARISTOCRATIS FOTAKIS whose telephone number is (571)270-1206. The examiner can normally be reached on Monday - Thursday 6:30 - 4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aristocratis Fotakis/

Examiner, Art Unit 2611

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611